

MULTIMEDIA TIME WARPING SYSTEM

ABSTRACT

5 A multimedia time warping system. The invention allows the user to store
selected television broadcast programs while the user is simultaneously
watching or reviewing another program. A preferred embodiment of the
invention accepts television (TV) input streams in a multitude of forms, for
example, National Television Standards Committee (NTSC) or PAL broadcast,
and digital forms such as Digital Satellite System (DSS), Digital Broadcast
10 Services (DBS), or Advanced Television Standards Committee (ATSC). The
TV streams are converted to an Moving Pictures Experts Group (MPEG)
formatted stream for internal transfer and manipulation and are parsed and
separated it into video and audio components. The components are stored in
temporary buffers. Events are recorded that indicate the type of component that
15 has been found, where it is located, and when it occurred. The program logic is
notified that an event has occurred and the data is extracted from the buffers.
The parser and event buffer decouple the CPU from having to parse the MPEG
stream and from the real time nature of the data streams which allows for slower
CPU and bus speeds and translate to lower system costs. The video and audio
20 components are stored on a storage device and when the program is requested
for display, the video and audio components are extracted from the storage
device and reassembled into an MPEG stream which is sent to a decoder. The
decoder converts the MPEG stream into TV output signals and delivers the TV
output signals to a TV receiver. User control commands are accepted and sent
25 through the system. These commands affect the flow of said MPEG stream and
allow the user to view stored programs with at least the following functions:
reverse, fast forward, play, pause, index, fast/slow reverse play, and fast/slow
play.